WHAT IS CLAIMED IS:

1. A lithography system comprising:

a light condenser having reflective surfaces concentric to an optical axis, each reflective surface to reflect light from a light source to produce an annular illumination that projects onto a mask to form a uniformly illuminated region on the mask, each reflective surface to reflect the light towards the mask with a predefined convergence angle, the convergence angle equal to the angle between the optical axis and a propagation direction of the light, the reflective surfaces collectively to reflect light towards the mask with more than one convergence angle.

2. The lithography system of claim 1 in which each reflective surface comprises a non-imaging reflective surface.

3. The lithography system of claim 1 further comprising the light source.

4. The lithography system of claim 1 further comprising projection optics to project an image reflected from the mask onto a substrate.

5. The lithography system of claim 1 further comprising a stepper to move the mask and the substrate, the movement of the substrate correlated to the movement of the mask.

6. The lithography system of claim 1 in which the light has a wavelength less than 300 nm.

7. The lithography system of claim 1 in which each reflective surface intersects a plane that passes through the optical axis at two curve segments, each segment comprising a portion of a parabolic curve that is rotated an angle about an axis perpendicular to the plane,

the rotation angle equal to the convergence angle of the light reflected by the reflective surface.

8. An apparatus comprising:

a first reflective surface to reflect light rays emanating from a point, the first reflective surface having a curvature such that substantially all of the reflected light rays propagate at a first angle relative to an axis that passes through the point and converge towards a region to produce uniform illumination at the region.

9. The apparatus of claim 8 in which the reflective surface comprises a ruthenium layer.

10. The apparatus of claim 8 in which the reflective surface comprises multilayer coatings.

11. The apparatus of claim 8 further comprising a second reflective surface to reflect light rays emanating from the point, the second reflective surface having a curvature such that the reflected light rays propagate at a second angle with the optical axis, the reflected light rays forming an annular wave front that converges towards the region.

12. The apparatus of claim 11 in which the second angle is different from the first angle.

13. An apparatus comprising:

a reflective surface positioned relative to an optical axis to reflect light rays emanating from a location on the optical axis so that the light rays converge towards a region on a plane perpendicular to the optical axis, the reflective surface having a curve segment that comprises a section of a parabolic curve having a focal point at the location and rotated an angle relative to the optical axis.

14. The apparatus of claim 13 in which the reflective surface comprises the surface swept by sweeping the curve segment about the optical axis.

15. The apparatus of claim 13 in which the rotation angle of the parabolic curve equals the angle between the optical axis and a propagation direction of light rays reflected by the reflective surface.

16. The apparatus of claim 13 in which the rotated parabolic curve may be represented by an equation

$$Z[x,f,\theta] = -\frac{1}{4} Csc^2[\theta]\, Sec[\theta]\left(-4f - 4f\, Cos[2\theta] + x\, Sin[\theta] + 8\sqrt{f}\,\sqrt{Cos^2[\theta](f - x\, Sin[\theta])} + x\, Sin[3\theta]\right),$$

where Z is the distance between a point on the curve and a plane passing through the location and perpendicular to the optical axis, x is the distance from the point to the optical axis, θ is the angle of rotation of the parabolic curve, and f is the focal length of the parabolic curve.

17. The apparatus of claim 13 in which the rotated parabolic curve may be approximated by a truncated expansion of an equation

$$Z[x,f,\theta] = -\frac{1}{4} Csc^2[\theta]\, Sec[\theta]\left(-4f - 4f\, Cos[2\theta] + x\, Sin[\theta] + 8\sqrt{f}\,\sqrt{Cos^2[\theta](f - x\, Sin[\theta])} + x\, Sin[3\theta]\right),$$

where Z is the distance between a point on the curve and a plane passing through the location and perpendicular to the optical axis, x is the distance from the point to the optical axis, θ is the angle of rotation of the parabolic curve, and f is the focal length of the parabolic curve.

18. A lithography system comprising:

a light source;

a light condenser having reflective surfaces concentric to an optical axis, each reflective surface to reflect light from the light source to produce an annular illumination that projects onto a mask to form a uniformly illuminated region on the mask, each reflective surface to reflect the light towards the mask with a predefined convergence angle, the convergence angle equal to the angle between the optical axis and a propagation direction of the light, the reflective surfaces collectively to reflect light towards the mask with more than one convergence angle;

projection optics to project an image reflected from the mask onto a substrate; and

a stepper to move the mask and the substrate, the movement of the substrate correlated to the movement of the mask.

19. The lithography system of claim 18 further comprising a position control tool to control relative positions of the light source, the light condenser, and projection optics.

20. The lithography system of claim 19 in which the light source comprises a plasma light source.

21. A method comprising:

generating light rays from a location on an optical axis;

reflecting the light rays with a first reflective surface having a curvature such that substantially all of the reflected light rays propagate with a first convergence angle relative to the optical axis, the light rays converging toward a region to produce uniform illumination at the region.

22. The method of claim 21 further comprising reflecting the light rays with a second reflective surface having a curvature such that substantially all of the light rays reflected from

the second reflective surface propagate with a second convergence angle relative to the optical axis, the light rays converging toward the region.

23. The method of claim 22 in which the second angle is different from the first angle.

24. A method comprising:

providing a first reflective surface to reflect light rays emanating from a location, the first reflective surface having a curvature such that reflected light rays propagate in a direction at a first angle with an axis and converge toward a region to produce uniform illumination at the region; and

providing a second reflective surface to reflect light rays emanating from the location, the second reflective surface having a curvature such that reflected light rays propagate in a direction at a second angle with the axis and converge toward the region, the second angle different from the first angle.

25. The method of claim 24 in which the first reflective surface and the second reflective surface are concentric to the axis and the first reflective surface is closer to the location than the second reflective surface.

26. The method of claim 24 further comprising adjusting the relative positions of the first and second reflective surfaces so that when light rays are reflected by the first reflective surface, the reflected light rays are not blocked by the second reflective surface.

27. The method of claim 26 further comprising treating the surface of the first and second reflective surfaces to enhance reflectivity of light having wavelength less than 300 nm.

28. A method of lithography comprising:

generating light rays having wavelengths less than 300 nm;

reflecting the light rays with a light condenser having a reflective surface with a curvature such that the reflected light rays converge relative to an optical axis towards a mask having a pattern to produce a uniformly illuminated region on the mask, the angle between the optical axis and the propagation direction of reflected light rays all being substantially the same;

focusing an image of a portion of the pattern illuminated by the light rays onto a photo-resist on a substrate; and

producing the pattern on the substrate.

29. The method of claim 28 further comprising adjusting the relative positions of the reflective surface, the mask, and the substrate.

30. The method of claim 28 in which the light condenser comprises multiple reflective surfaces.